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THE NEW ENGLAND BOTANICAL CLUB

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THE OLD STUMPS AT BLANC SABLON.[1]

CHARLES W. TOWNSEND, M.D.

PROFESSOR M. L. FERNALD, who, in 1910, made at this point [Blanc Sablon] a brief incursion into Labrador has most interestingly described the region in the pages of RHODORA.[2] "Here" he says "was an ideal place to study the vegetation of a highly calcareous region side by side with the plants of a silicious and gneissoid area, and if anyone doubts the dissimilarities of these floras he can find no better spot in which to undeceive himself than at Blanc Sablon."

Like him I was struck by the flat grassy plains on the tops of the terraces, so different from the rounded and irregular surfaces of the granitic rocks with their wealth of mosses and lichens and their comparative paucity of grasses. Prof. Fernald says "The *commonest flower* of the Laurentian plains is *Carex rariflora*, though with singular regard for its specific name it is by all means the rarest of its genus in New England." But the most surprising feature which is described and figured by Prof. Fernald is the presence of stumps of forest trees, and with them a forest vegetation still lingering in the plains now fully exposed to the sun. Dwarf cornell, snow berry, Linnaea, star flower, clintonia, one-flowered pyrola and dwarf solomon seal were most in evidence, and Professor Fernald mentions also such typical forest species as red baneberry, Dewey's sedge, great-spurred violet, miterwort and sweet-scented bedstraw.

I measured several of the stumps that were a foot or two high with

[1] Read by invitation at a meeting of the New England Botanical Club, May 5, 1916. Extract from Chapter XII of "In Audubon's Labrador."

[2] "A Botanical Expedition to Newfoundland and Southern Labrador." M. L. Fernald, RHODORA, xiii, 109–162 (1911).

great sprawling roots, now destitute of bark and blanched by the sun and storm, but yet fully a foot in diameter or three feet in circumference. Sometimes a prostrate trunk three or four feet long would be seen. One pictures an ancient forest, very different from the grassy plains with occasional clumps of dwarfed and stunted spruces and fir bushes that are here now.

Professor Fernald was much interested in these stumps. He says: "In such accounts as I have found (except possibly Cartier's) the coasts of the Straits of Belle Isle are described as desolate and bare, and even Cartier, in 1534, entering the Straits and anchoring at Blanc Sablon, was so impressed with the barrenness that he wrote: 'If the land was as good as the harbors there are, it would be an advantage; but it should not be named the New Land but [a land of] stones and rocks frightful and ill shaped, for in all the said north coast I did not see a cart-load of earth, though I landed in many places. Except at Blanc Sablon there is nothing but moss and small stunted woods; in short I deem rather than otherwise, that it is the land that God gave to Cain;'[1] and again on his second voyage in 1535, he wrote: 'The whole of the said coast from the Castles as far as here [note, by Prof. Fernald, "From Chateau Bay as far as Brest, west of Blanc Sablon"] bears east-northeast and west-southwest, ranged with numerous islands and lands all hacked and stony, without any soil or woods, save in some valleys'.[2] And at the present time the people at Blanc Sablon insist that there has never been any forest there and that no timber exists within four or five miles of the Straits. Yet, the first day I saw upon the terraces east of Blanc Sablon such plants as have just been enumerated I was convinced that a forest must have been there, since these are so distinctly woodland species and so decidedly not plants typical of the Arctic barrens and tundra. So my delight can be imagined when, crossing with Kidder the tableland east of Blanc Sablon, we came upon buried logs in the bog and soon after found numerous stumps protruding from the moss. Some of the stumps, now much crumbled, were still a foot or more in diameter and indicated an ancient forest of considerable size. Just when this forest lived it is difficult to say, but if it still throve in the 16th century Cartier did not give a very clear indication of it. Only by such indefinite expressions as 'except at Blanc Sablon there is nothing but moss and stunted woods' and 'without any soil or woods, save in the

[1] J. P. Baxter, Memoir of Jacques Cartier, 86 (1906).
[2] J. P. Baxter, l. c. 130.

valleys' did he indicate a possible forest covering. But here at least was a remnant of the forest which had once sheltered *Carex Deweyana, Actaea rubra* and *Viola Selkirkii,* though at the present time only shrubs or dwarf straggling trees, as described by Cartier, thrive on the bleak and wind-swept shores of the Straits of Belle Isle; and that the forest was an extensive one and presumably once fringed the entire length of the Straits we are safe in assuming from the presence at Bonne Espérance L'Anse au Clair, Forteau, Red Bay, and Chateau (as shown by the collections of John A. Allen and others) of a relic forest vegetation (sometimes further augmented by *Onoclea sensibilis, Osmorhiza obtusa, Pyrola secunda,* etc.) such as abounds on the terraces of Blanc Sablon."

The name of the island near at hand "Isle au Bois" hints at the former presence of a forest, yet if forests existed in Cartier's time we should expect a different account from him. Our knowledge of the history of the Labrador Peninsula since the glaciers melted a few thousand years ago would negative the possibility of a climate or topography that could support a forest such as these stumps and woodland plants suggest. Moreover the stumps themselves can hardly date back to Cartier who found "the land that God gave to Cain."

How can we explain the seeming paradox? Like many things in nature, the explanation, which I chanced upon in a walk over the plains to Anse Éclair, is very simple. The answer is there has been no change; here are forest conditions at the present day, and here are plenty of forest trees right before our eyes. Where the ancient white stumps are so prominent the forest has been cut away as is apt to be the case near settlements, but farther away to the east and west along the coast there are regions where forest conditions of darkness, dampness and quiet reign as truly as in the forest aisles where the trees rear their heads to the skies and wave and sough in the winds. The forest vegetation is the same in both cases.

One is at first disposed to deny these statements and say there are no trees here, merely spruce and fir bushes, insignificant things with flat tops clipped as it were by the arctic blasts, but a close examination reveals the forest conditions. This examination is extremely difficult unless one is provided with an axe, or, better still finds a place where wood cutting has recently taken place, and the actual habits of the wood-cutter can be learned. This gives the key to the situation and at once explains the existence of the ancient stumps.

From a study of a number of partial clearings in various places about Blanc Sablon I found that the wood-cutter often chooses a spruce or fir bush with a large central trunk, first cuts off the branches, and then the whole top of the trunk, leaving a stump exactly like the stump figured by Professor Fernald which so irresistably compels in us the conception of a lofty tree, a conception, which, to a botanist, is rendered still more compelling by the presence, in the neighborhood of the stumps, of a type of vegetation found only in forests. I regret that a photograph I took of one of these trees that had been partly cleared of branches proved to be one of the mysterious failures which happen at times to all except super-human photographers, but I am able to give the dimensions of this tree, which, it seems to me, thoroughly sustains my contention. The tree was a black spruce with a trunk forty-seven inches in circumference one foot from the ground. Its diameter was therefore about one foot, two and a half inches. This size of the trunk was maintained nearly to the highest branch which went off at right angles thirty-two inches from the ground. From the center to the tip of the branches on all sides was nine feet making a diameter for the whole tree of eighteen feet. It is true that many of the clumps of evergreen bushes are made up of a number of small trunks, but it is also true as I found that trunks of the size just described were not uncommon. In places the trunks are four or even five feet high.

When the trees are continuous over a considerable area they form an almost impassible barrier. Many times, beguiled by a favorable opening, I determined to disregard the difficulties and pass through a hundred yards or so to an open land beyond when I found my progress so barred after a hard struggle of a few yards, that it seemed an economy of both time and effort to go even a mile around, rather than to attempt the straight and extremely narrow course. Where the trees are only a foot or two high, one can walk on their tops, but this is out of the question in trees four or five feet high. Perhaps one could have managed it with modified snow shoes.

To delve beneath these ancient trees, — for my former studies of tree rings in various places on the Labrador Coast assures me that many of these trees must be much over a hundred years old and may in some cases date back even to Cartier — is a difficult task, but one finds here a habitat in which forest plants are surely at home.

BOSTON, MASSACHUSETTS.

TWO ASIATIC ALLIES OF RANUNCULUS PENSYLVANICUS.

S. S. Chien.

Specimens of two species in the Gray Herbarium, collected in China and Hongkong, are under the name of *Ranunculus pensylvanicus* L. One of these plants from Hongkong and Shanghai is erect and more or less like the American species, except in its fruit character. The other plant, one sheet of which is from Fokien and another from Hupeh, has its fruit similar to the American plant, although with strongly hooked style, but has a repent habit. Both of these species have been considered identical with the American plant. Since they differ, however, from the American species in such important characters, it seems desirable to describe them under new names.

Ranunculus **brachyrhynchus**, n. sp., caule erecto elato pilis late patentibus hirsuto; foliis inferioribus longe petiolatis, superioribus subsessilibus; foliolis petiolulatis inaequaliter 3-lobatis argute serratis; floribus parvis; sepalis reflexis subtus hirsutis supra glabris; achaeniis in capite globoso vel paullo lateque ovoideo symmetricis tam in margine dorsali quam ventrali aequaliter curvatis; stylo brevi recto basi lato ad apicem achaenii centroso, faciebus achaeniorum planis prominenter marginatis; receptaculo piloso.

Stem erect, tall, hirsute with widely spreading hairs; lower leaves long-petioled; upper subsessile, ternatifid; leaflets stalked, unequally 3-lobed, sharply serrate, acute: flowers small: sepals reflexed, hirsute on the lower side, glabrous on the upper; achenes in a globose or slightly broad-ovoid head, symmetrically curved on both the dorsal and ventral margins; style short, broad-based, straight, centrally placed; faces of the achene prominently margined; receptacle pilose.—Hongkong: April 17, 1893, *Hongkong Herbarium*, no. 10,200 (type in Gray Herb.). China: Shanghai, comm. *Wykeham Perry*, 1883.

This plant is distinguished from *R. pensylvanicus* L. by the symmetrical outline of the achene, the dorsal and ventral margins being about equal, by the prominent intramarginal ridge and the centrally placed beak. The American plant has its fruit with round dorsal edge and almost straight ventral edge, and it is obscurely margined. The head of achenes of the Chinese plant is essentially globose, while that of the American plant is elongated.

Ranunculus **arcuans**, n. sp., caule 10–17 cm. longo repente pilis late patentibus hirsuto; foliis radicalibus longius petiolatis quam caulinis, omnibus ternatifidis dense hirsutis in facie inferiore supra sparse pilosis; foliolis 3-lobatis; lobis grosse dentatis; floribus parvis; sepalis reflexis subtus hirsutis supra glabris; achaeniis in capite globoso prominenter marginatis margine dorsali rotundatis, margine ventrali vel minus rotundatis vel rectiusculis, faciebus planis, rostro in apicem arcuatam attenuato.

Stem 10–17 cm. long, repent, hirsute with bristling widely spreading hairs: radical leaves longer-petioled than the stem-leaves, all ternatified, densely hirsute on the lower side, sparingly pilose on the upper; leaflets 3-lobed, lobes coarsely toothed: flowers small: sepals reflexed, hirsute on the lower side, glabrous above: achenes in a globose head, prominently margined, dorsal margin rounded, ventral much less so or nearly straight; faces flat; beak attenuate into a hooked tip.— China: Province of Hupeh, 1885–88, *A. Henry*, no. 4039 (type in Gray Herb.); Province of Fukien, 1904, *Hongkong Herbarium*, no. 2317.

This plant has a low and repent habit as contrasted with *R. pensylvanicus* L., which is high and erect. The achenes of these two species are more or less alike but the style in the Chinese plant is longer than in the American and conspicuously hooked. The achenes of the Chinese plant are also prominently margined and the shape of the head of achenes is globose.

Shanghai, China.

GALIUM PILOSUM AND ITS VARIETIES.

C. A. Weatherby and S. F. Blake.

Ever since 1841 the traditional treatment of *Galium pilosum* has been that adopted in Torrey and Gray's Flora of North America, distinguishing a typical, wide-spread variety with pubescent stem and commonly oval leaves, and a southern one nearly or quite glabrous and with narrower, more oblong leaves. The recent collection by one of us, on Cape Cod, of two apparently different forms has led to a study of the forms of the species which shows that at least one more variety can profitably be recognized, and also leads to what we may

hope to be the final retirement from our lists of the name *Galium bermudense* L. which has been associated with this and with two or three other species of *Galium* and *Relbunium* within recent years.

All the material of *Galium pilosum* in the Gray Herbarium and the Herbarium of the New England Botanical Club from north of a line running from western North Carolina and adjacent Kentucky to Arkansas and Texas has the stem more or less pubescent on the angles, usually densely so but sometimes only sparsely, with generally straightish pilose or pilose-hispid hairs, usually reaching up to or into the inflorescence, but sometimes confined to the lower portion of the plant. Occasionally some of the hairs are more or less recurved or, more rarely, inflexed. In the Cape Cod area, in the sand-plain regions of Connecticut and New Jersey and in the mountains of North Carolina occurs an extreme of this form having the sides of the stem as well as the angles more or less densely pubescent. At first it seemed that this plant might well be distinguished as a variety, but careful study of the available material has shown too great a proportion of specimens variously intermediate between the two extremes to make it desirable, in the present state of our knowledge, to attempt to separate them, although further field study may yet make this possible. The following specimens may be cited as representative of this more pubescent extreme: — New Jersey: sand-hills, Atlantic City, July 14, 1870, *C. F. Parker*. North Carolina: summit of Cedar Cliff Mt., alt. 3400 ft., July 16, 1898, *Biltmore Herb.* no. 3498b. To the less pubescent of these two forms belongs the Aiton type of *Galium pilosum* (New York, *Dr. Martin*) in the British Museum.

From Virginia to Florida and Texas there occur two very distinct varieties of *G. pilosum*, hitherto confused under the name var. *puncticulosum* (Michx.) T. & G. One of these has oval leaves as in the typical form of the species, pubescent with incurved, short, stiff hairs, and stem more or less densely beset on the angles with short, incurved, hook-like hairs distinctly harsher than the hairs of the typical form; the other, with more narrowly elliptic leaves and absolutely glabrous stem, might conceivably be regarded as specifically distinct but seems on the whole, from its identity in all other characters and from the presence of an occasional intermediate, better considered as worthy only of varietal rank. Dr. H. Lecomte and M. F. Gagnepain of the Paris Museum, to whom sketches and descriptions of these two forms were sent, have kindly examined the Michauxian type of

Galium puncticulosum and find it to be the former; for the latter, the varietal name *laevicaule* may appropriately be used.

The disposition of Linnaeus's *Galium bermudense* has always been a matter of dispute to botanists and a full identification of its elements has never previously been made. It was described thus: —

"GALIUM foliis quaternis linearibus obtusis, ramis ramosissimis. Aparine foliis quaternis obtusis laevibus. *Gron. virg.* 16. Rubia tetraphylla glabra, latiore folio, bermudensis, seminibus binis atropurpureis. *Pluk. alm.* 324. *t.* 248. *Raj. suppl.* 261.

Habitat in Virginia." [1]

The Gronovian name is based on *Clayton* 313 in the British Museum which is the less pubescent phase of the typical form of *Galium pilosum*, very similar to Aiton's type. Plukenet's plant, still preserved at the British Museum, is *Relbunium hypocarpium* (L.) Hemsl.[2] with which it has previously been identified by Mr. Britten, who takes up for it the name *Relbunium bermudense* (L.) Britten.[3] Ray's plant, which seems never to have been examined hitherto, is *Galium circaezans* Michx., collected in Maryland by Krieg or Vernon. As if this confusion were not enough, we find in Linnaeus's own description a character ("foliis . . . . linearibus") which could by no possibility apply to any of these three species. Nor is there any specimen named *G. bermudense* in the Linnaean herbarium. Finally, the specific name "bermudense" taken from Plukenet's polynomial is quite at variance with the habitat, Virginia, attributed to the species by Linnaeus.

When we come to examine the treatment of *Galium bermudense* by authors subsequent to Linnaeus, we find an absolute lack of uniformity. Walter copies the Linnaean description without comment. Michaux has it not, but describes as new *G. puncticulosum*,[4] quoting *G. purpureum* Walt. (nec L.) as synonymous and Clayton's 313 as doubtfully identical. Willdenow [5] altered the name to *G. bermudianum* without changing the description and, in the fashion of some modern botanists, added the "popular" name "Bermudisches Lab-

[1] Sp. Pl. i. 105 (1753).

[2] The species was named *Valantia hypocarpa* by Linnaeus in 1759 without reference to Plukenet's plant. Its chief synonyms are: — *Valantia hypocarpa* L. Pl. Jam. Pug. 30 (1759): *V. hypocarpia* L. Syst. ed. 10. ii. 1307 (1759): *Relbunium hypocarpium* Hemsl. Biol. Centr. Amer. Bot. ii. 63 (1881). As the species was first published as *Valantia hypocarpa*, its specific name under *Relbunium* should be written "*hypocarpum*."

[3] Journ. Bot. xlvii. 42 (1909).

[4] Fl. Bor.-Am. i. 80 (1803).

[5] Sp. Pl. i. pt. 2. 596 (1798).

kraut" for a species whose habitat is still given as Virginia. Pursh [1] retains the name but gives a description applicable only to *G. puncticulosum* Michx., which in fact he cites as a synonym, and has *G. pilosum* as a distinct species. Pursh's action consequently cannot be taken as determining the application of the name, since he associates it (in the form *bermudianum*) with a plant not an element of the original Linnaean species. With Torrey,[2] Elliott [3] and other early writers on American botany, *G. bermudense* or *G. bermudianum* was a species of considerable uncertainty. In the Prodromus [4] *G. bermudianum* Pursh was referred to *G. puncticulosum* Michx., of which *G. pilosum* was made a variety. In Torrey & Gray's Flora of North America [5] "*G. bermudense* Linn. *spec.* 1. p. 105, as to syn. *Gronov.*, but not of *Pluk. alm. t.* 248" was referred to *G. pilosum*, var. *puncticulosum*, and the statement was made that "the name of *G. Bermudense* should be retained for the 'Rubia tetraphylla glabra, latiore folio, Bermudensis' etc. of Plukenet." In the Synoptical Flora,[6] however, "*G. Bermudense*, L. Spec. i. 105, as to syn. Pluk." was referred to typical *G. pilosum* and "*G. Bermudense*, L. l. c. as to syn. Gronov." to its var. *puncticulosum*. In Britton & Brown's Illustrated Flora, ed. 1 [7] *G. bermudense* appears as a doubtful synonym of *G. pilosum*, but in the second edition [8] we find *G. bermudense* displacing *G. hispidulum* Michx. as the name for that relbunioid *Galium*.

To recapitulate: — *Galium bermudense* L. as originally published included *G. pilosum*, *G. circaezans*, and *Relbunium hypocarpum*, all of which would be excluded by its description, and its name was in contradiction with the habitat assigned it. It has since been identified, in whole or in part, with *Galium pilosum*, *G. puncticulosum*, *G. hispidulum*, and *Relbunium hypocarpum*. It seems to the writers that under the circumstances the name *Galium bermudense* L. had best be relegated forever to the limbo of *nomina confusa*.

The varieties of *Galium pilosum* will then stand as follows: —

* *Stem from densely pilose all over to sparsely spreading-pilose or spreading-hispid-pilose on the angles below.*

G. PILOSUM Ait. Hort. Kew i. 145 (1789); Willd. Sp. Pl. i. pt. 2. 599 (1798); Pursh, Fl. Am. Sept. i. 104 (1814); T. & G. Fl. N. Am. ii.

[1] Fl. Am. Sept. i. 104 (1814).
[2] Fl. N. & Mid. U. S. i. 169 (1824).
[3] Sk. i. 196 (1816).
[4] iv. 601 (1830).
[5] ii. 24 (1841).
[6] i. pt. 2. 37 (1884).
[7] iii. 221 (1898).
[8] iii. 266 (1913).

24 (1841) excl. syn. Walt.; Gray, Syn. Fl. i. pt. 2. 37 (1884) excl. syn. L. and Walt. *G. bermudense* L. Sp. Pl. i. 105 (1753), as to syn. Gronov. and habitat only. *G. bermudianum* Willd. Sp. Pl. i. pt. 2. 596 (1798), as to syn. Gronov. and habitat only. *G. puncticulosum*, β. *pilosum* DC. Prod. iv. 601 (1830). *G. rotundifolium* L. ϑ. *bermudense* Ktze. Rev. i. 282, 283 (1891), at least in part. *G. rotundifolium* ϑ. *bermudense* f. *pilosum* Ktze. l. c. 282.— Southern N. H. and southern Vt. to D.C. and in the mts. to N. C. and Ky., west to Ill., Kan., and Tex. Representative specimens examined:— Virginia: along Peak Creek, Peak Mtn., alt. 2200 ft., July 16, 1892, *J. K. Small;* Fall Creek, alt. 585 ft., July, 1893, *A. A. Heller*, no. 1108 (this specimen matches *Clayton* 313 fairly well). West Virginia: rocky hillside near Travellers' Repose, Sept. 19, 1904, *Greenman*, no. 310. Kentucky: Poor Fork P. O., Harlan Co., Aug., 1893, *T. H. Kearney, Jr.*, no. 233. Texas: between Bejar and el Rio de la Trinidad, May, 1828, *Berlandier*, no. 1578.

** *Stem merely finely incurved-uncinate on the angles or glabrous.*

Var. puncticulosum (Michx.) T. & G. Stem finely and usually densely incurved-uncinate on the angles, at least below; leaves oval, 1–2.3 cm. long, 4–10 mm. wide, 2–2½ times as long as wide, their hairs incurved-uncinate like those of the stem.— Fl. N. Am. ii. 24 (1841) in part; Gray, Syn. Fl. i. pt. 2.37 (1884) in part. *G. purpureum* Walt. Fl. Car. 87 (1788), not L. *G. puncticulosum* Michx. Fl. Bor. Am. i. 80 (1803), excl. Clayt. no. 313. *G. punctatum* Pers. Syn. i. 128 (1805). — Virginia: Bedford Co., Aug. 1871, *A. H. Curtiss.* Georgia: Bullock Co., dry pine barrens, June 26, 1901, *R. M. Harper*, no. 947. Florida: Duval Co., roadside, June 10, 1902, *A. Fredholm*, no. 5290; Lake Co., high pine land near Eustis, July 1894, *G. V. Nash*, no. 1383; without definite locality, *Chapman.* Mississippi: Biloxi, July 1900, *S. M. Tracy* " = 4485." A specimen from dry woods, Athens, Ga., June 25, 1900, *R. M. Harper*, no. 38, is intermediate between this variety and the typical form.

Var. **laevicaule** n. var., caule omnino glabro; foliis anguste ellipticis 1.2–2.8 cm. longis 3–7 mm. latis, longitudine quam latitudine 2½–4-plo majore, sparse pilosis, pilis non valde incurvatis.

Stem glabrous throughout; leaves narrowly elliptic, 1.2–2.8 cm. long, 3–7 mm. wide, 2½–4 times as long as wide, sparsely pilose with hairs which are not strongly incurved.— Var. *puncticulosum* T. & G.

l. c. and subsequent authors, in part.—VIRGINIA: Norfolk, *Dana*. FLORIDA: low fertile ground near Jacksonville, June 18, 1898, *A. H. Curtiss*, no. 6420 (TYPE, in Gray Herb.); moist places, near Eustis, May, 1894, *G. V. Nash*, no. 838. TEXAS: ("floribus albis") Houston, June 1843, *Lindheimer*. A specimen from dry hillsides and woods, Alexandria, La., May 31, 1899, *C. R. Ball*, no. 514, is intermediate between this variety and the typical form.

THE REPRESENTATIVES OF TRISETUM SPICATUM IN EASTERN AMERICA.

M. L. FERNALD.

TRISETUM SPICATUM (L.) Richter, var. **pilosiglume**, n. var., culmis densissime tomentosis 1.5–5 dm. altis; foliis plus minusve pilosis, vaginibus tomentosis, pilis reflexis; paniculis plerumque argenteo-viridibus rare subviolaceis deinde albido-brunneis 2–7 cm. longis valde interruptis; spiculis 2–3-floris; glumis pilosis, inferiore lanceolato-attenuata 3.5–4 mm. longa, superiore ovato-lanceolata subaristata 3.5–4.7 mm. longa; lemmatibus 4.6–6.3 mm. longis lanceolatis apice laciniis setiformibus valde bipartitis; palea lemmate paullo breviori-bus apice laciniis setiformibus valde bipartita.

Culms densely tomentose, 1.5–5 dm. high: leaves more or less pilose: the sheaths tomentose with reflexed hairs: panicles mostly silvery-green, rarely somewhat violaceous, finally whitish-brown, 2–7 cm. long, obviously interrupted: spikelets 2–3-flowered: glumes pilose; the lower lance-attenuate, 3.5–4 mm. long; the upper ovate-lanceolate, subaristate, 3.5–4.7 mm. long: lemmas 4.6–6.3 mm. long, lanceolate, obviously 2-cleft at apex into setiform segments: palea a little shorter than the lemma, its apex 2-parted like the lemma.—Labrador and Newfoundland to northern New England and Ontario. LABRADOR: Rama, August 20–24, 1897, *J. D. Sornborger*, no. 240, in part; Okkak or Hebron, 1853, *Moravian Bros.*; Hopedale, August 4–6, 1897, *Sornborger*, no. 241; limestone and calcareous sandstone terraces, Blanc Sablon, August 1, 1910, *Fernald & Wiegand*, no. 2,569. NEWFOUNDLAND: island off Pike's Arm, July 19, 1911, *Fernald, Wiegand & Bartram*, no. 4,593 (TYPE in Gray Herb.); rocks, Black Island, July 20, 1911, *Fernald, Wiegand & Bartram*, no. 4,594; dry sea-cliffs, Tilt Cove, August 20, 1911, *Fernald, Wiegand & Darlington*, no. 2,568; dry limestone barrens, upper slopes and tablelands, alt. 200–300 m.,

Table Mountain, Port à Port Bay, August 16, 1910, *Fernald, Wiegand & Kittredge*, no. 2,571, July 16 & 17, 1914, *Fernald & St. John*, no. 10,780[a]. Quebec: damp calcareous rocks, Bradore, Saguenay Co., August 4, 1910, *Fernald & Wiegand*, no. 2,570; dry turf, Pointe à Peau, Brest, Saguenay Co., July 31, 1915, *St. John*, Herb. Geol. Surv. Can.; limestone detritus, near crest of Cap Barré, Percé, August 1, 1907, and cold northerly calcareous walls of Grande Coupe, Percé, August 5, 1907, *Fernald & Collins*, nos. 867, 868; on hornblende schist or in alluvium of an alpine brook, Allen's Ravine, north slope of Mt. Albert, July 26 & 28, 1906, *Fernald & Collins*, no. 401; crevices of limestone-conglomerate, north side of Cap Enragé, Bic, July 24, 1907, *Fernald & Collins*, no. 866. Ontario: exposed places, Red Rocks, Lake Superior, June 26, 1884, *J. Macoun*. Maine: slide, west wall of North Basin, Mt. Katahdin, July 13, 1900, *Fernald*. New Hampshire: "in alpinis, cum *Oxyria*," White Mountains, *E. Tuckerman;* Mt. Washington, July 3, 1878 and July 29, 1887, *Faxon;* damp slopes, Alpine Garden, Mt. Washington, July 10, 1895 and August 7, 1896, *E. F. Williams*, August 19, 1907, *A. S. Pease*, no. 10,601; Bigelow Lawn, Mt. Washington, September 1, 1877, *Faxon;* Great Gulf, Mt. Washington, August, 1877, and September 1, 1877, *Faxon*, August 30, 1910, *A. S. Pease*, no. 12,884; on the "Fan," Huntington's Ravine, August 28, 1912, *A. S. Pease*, no. 13,897. Vermont: Smuggler's Notch, July 5, 1897, *J. R. Churchill* (mixed with var. *molle*); "in rupestribus siccis umbrosis ad Colchester," *Wm. Oakes*.

In its pilose glumes unique in the maze of plants which pass undistinguished as *Trisetum spicatum*. In its comparatively small spikelets and interrupted inflorescence somewhat intermediate between the more arctic-alpine *T. spicatum*, var. *Maidenii* (Gandoger)[1] and *T. spicatum*, var. *molle* (Michx.) Piper.

True *Trisetum spicatum* of Europe, based upon *Aira spicata* L. Sp. Pl. i. 64 (1753), is apparently not found in northeastern America, though some Arctic and northwestern specimens may belong to it. The alpine plant of Europe, as shown by many specimens and descriptions as well as by such plates as those of Hallier,[2] Hartinger[3] or Correvon,[4] is a low plant (0.5–2 dm. high), with sheaths and leaf-blades either pubescent or glabrous; the inflorescence cylindric to obovoid, violet, bronze or brownish, very dense and spike-like, 1.5–3 cm. long,

[1] Trisetum spicatum (L.) Richter, var. **Maidenii** (Gandoger), n. comb. *T. subspicatum*, f. *Maidenii* Gandoger, Bull. Soc. Bot. France, xlix. 182 (1902) *T. Maidenii* Gandoger, l. c. (1902).

[2] Hallier, Fl. von Deutschl. ed. 5, vii. t. 614 (1881).

[3] Hartinger & Della Torre, Atl. Alpenfl. iv. t. 428 (1884).

[4] Correvon, Atl. Fl. Alp. v. 471 (1901).

1–2 cm. thick (including the wide-spreading awns). In fact, the inflorescence is so very dense as to suggest, at first glance, that of *Phleum alpinum* or an *Alopecurus;* and it is noteworthy that an exceptionally discriminating New England botanist, long familiar in the field with the American var. *molle*, has placed in the Gray Herbarium a fine sheet of typical *T. spicatum* collected by himself on a mountain-summit of Salzburg, numbered and carefully labeled, but with no indication of even the generic name of the grass, which to his New England eyes seemed quite strange! In this typical *T. spicatum* the elliptic-lanceolate brown-edged smooth or merely scabrous-nerved glumes are acute or sometimes very slightly aristate, the upper 4–5 mm. long; the attenuate soft lemmas are 3–4 mm. long, slightly 2-cleft but scarcely aristate, and the palea is usually blunt and fimbriate at summit.

In Greenland and other regions of Arctic American and to some extent in northernmost Eurasia, the low plant with very dense inflorescence gives way to var. *Maidenii*, which is taller (1.5–3.5 dm. high) and with a looser interrupted inflorescence 2–6.5 cm. long, which has spikelets as in typical *T. spicatum* but with the glumes, lemmas and often the paleas more definitely aristate-tipped. This Arctic American representative of the species is apparently less common south of Greenland than var. *pilosiglume*, but it occurs on the Torngat Mts. of northeastern Labrador, and very locally south to the mountains of Newfoundland, and the Mingan Islands and the mountains of Gaspé County, Quebec.

In more temperate areas, of the Canadian and Transition regions, we get var. *molle* (Michx.) Piper,[1] which is based upon *Avena mollis* Michx,[2] a plant originally collected at Montreal. This plant in its typical development seems specifically distinct from *T. spicatum* of Europe, but through var. *Maidenii* and again through var. *pilosiglume* the series seems to merge and, until the complex which is passing in many regions as *T. spicatum* is more thoroughly studied, it is well to consider it an extreme variation. Var. *molle* is a tall slender plant, the culms 2–8 dm. high, bearing silvery-green, finally whitish-brown, much interrupted panicles 2.5–11 cm. long. Its spikelets are commonly larger than in our other varieties, the 2nd. glume 4.5–6.5 mm. long, and the glumes, the deeply 2-cleft lemmas and commonly the

[1] Piper, Contrib. U. S. Nat. Herb. xi. 125 (1906).
[2] Michx. Fl. Bor-Am. i. 72 (1803).

deeply 2-cleft attenuate paleas are obviously awn-tipped. This plant, which may deserve specific reinstatement, but which seems to pass directly into the other varieties, does not occur in the bleaker habitats nor the more northern regions, like the headlands of Newfoundland and the coast of Labrador, where the others are found. Geographically, it is decidedly more southern: known in Newfoundland only along the sheltered river-banks; and on the mainland extending from Rimouski Co., Quebec, westward across the continent, south very generally on ledgy shores or slopes through northern and western New England and north-central New York, and locally to the Carolina mountains.

Gray Herbarium.

ON THE MENDELIAN INTERPRETATION OF OENOTHERA CROSSES.

R. Ruggles Gates.

In a recent review of my book on Mutations,[1] East[2] takes occasion to repeat certain criticisms of the Oenothera work which have been reiterated in recent years with rather tiresome frequency. This criticism is to the effect that since it is known that in the Oenotheras a considerable percentage of the pollen grains, eggs and embryos frequently fail to develop, therefore it is impossible to draw any conclusions whatever from the abundant crossing experiments that have been made in this genus; unless, perchance the result happens (as it occasionally does) to be Mendelian. In the case of East, we are further assured that "no single fact discovered by those who have made pedigree cultures of the group, precludes a Mendelian interpretation." I venture to think that such a statement would only be made by one who had allowed his bias to outrun his discretion. It would further, I think, scarcely have been made if its author had first attempted to apply his idea to an explanation of the known facts.

[1] Gates, R. Ruggles, 1915. The Mutation Factor in Evolution, with particular reference to Oenothera. London: MacMillan. pp. xiv + 353, figs. 114.

[2] East, E. M. 1915. Rhodora **17**: 235–237.

As the matter is one of some importance, involving as it does the whole question of the interpretation of mutations in certain aspects, it may be worth while to point out some of the difficulties which East has failed to see. He will then have the opportunity of explaining them on a Mendelian basis.

It would be quite impossible in a limited space to discuss all the classes of cases which do not conform to the Mendelian conception, but a few of them, belonging to one class only, may be pointed out.

In the first place let us consider what de Vries calls mutation crosses, such as *Oe. Lamarckiana* × *rubrinervis* or its reciprocal. In such crosses the F_2 splits into the two parental types[1] and both breed true in later generations. We are assured by some that this can be explained as ordinary segregation, but for such an explanation the following assumptions must be made: (1) that *Lamarckiana* is heterozygous for the *rubrinervis* character, (2) that it breeds true both before and after the cross because the *rubrinervis* germ cells either fail to develop or fail to fertilize each other, (3) that about 50% of the *Lamarckiana* germ cells are *rubrinervis* in character, since *rubrinervis* usually appears with this frequency in crosses with *Lamarckiana*. Thus far the assumptions, though improbable are not impossible, and the fact that *Lamarckiana* may show 50% or more of sterility leaves the interpretation a loophole through which to crawl.

Now let us go a step further. If other flowers on the same *Lamarckiana* plant used to cross with *rubrinervis* are pollinated by *nanella* the dwarf mutant, the F_1 will again contain the parent forms *Lamarckiana* and *nanella* in widely fluctuating percentages, and the same result occurs in the reciprocal cross *Oe. nanella* × *Lamarckiana*. We must now apply the above Mendelian hypotheses *mutatis mutandis* to these crosses, and assume that some 50% or more of our *Lamarckiana* germ cells are now *nanella*. The same must be done for all the other forms which show a similar behavior in crosses with *Lamarckiana*. This is of course absurd, for it assumes that 50% of the *Lamarckiana* germ cells are at the same time *nanella*, *rubrinervis*, *oblonga*, etc. The only way out of this difficulty that I can see is by the further assumption that when one crosses *Lamarckiana* with *nanella* pollen all the *rubrinervis* germ cells present obligingly disintegrate and disappear,

[1] The form of *rubrinervis* derived from this cross has since been found to differ in certain particulars and has been called *subrobusta*. But this does not alter the interpretation of the facts.

while when *rubrinervis* pollen is used the *nanella*-carrying eggs of *Lamarckiana* disappear. Will anyone be found willing to support such an hypothesis?

But the difficulties with a Mendelian interpretation of these crosses have only begun. How are we to account for the fact that both *Lamarckiana* and *nanella* from the F_1 of *Lamarckiana* × *nanella* breed true? On the Mendelian assumption it must be because in these *Lamarckiana* plants the *nanella*-carrying germ cells all degenerate, either in the pollen or the egg cells or both. Otherwise when selfed they would produce *nanella* in F_2. Is this degeneration a reasonable assumption when we know that in *rubrinervis* × *nanella* some of the *rubrinervis* plants appearing in F_1 when selfed split out *nanella* in a ratio which is, in some cases at least, close to 3:1? That is, we know that *rubrinervis* plants which are heterozygous for *nanella* develop their two types of germ cells according to regular Mendelian expectation, and it would be, to say the least, highly improbable that the closely related *Lamarckiana* would behave in an entirely different manner and that its *nanella* germ cells (assuming that there are such) would degenerate.

Another fact which East must explain is this: Why is it that *Lamarckiana* × *nanella* yields dwarfs in F_1 while *rubrinervis* × *nanella* only yields them in F_2, or in other words why is it that the first result is a mutation cross while the second is a Mendelian result as regards the dwarf character? So far as I am aware, no Mendelian has attempted to offer an explanation of this significant fact.

There is yet another fact in this connection which has not even been considered, still less explained, by the critics. This is that while *Lamarckiana* gives rise to the mutant *nanella*, *rubrinervis* has never been known to do so in all the extensive cultures. Is it unreasonable to connect these facts with those mentioned in the last paragraph?

The mutationist conception on the other hand, while it may not furnish a complete explanation, at least enables us to consider all these facts under a consistent point of view and does not lead to any of the absurdities which lurk in a Mendelian interpretation. Moreover, it offers an explanation of whole classes of facts which no Mendelian writer has attempted to explain. Let us consider this conception as it applies to the facts we have cited. DeVries has assumed that pangens, or if you like, factors for the differences between the mutants and their parent *Lamarckiana*, may exist in

three conditions, (1) labile, (2) active, (3) inactive; that, *e. g.*, the *nanella* pangen or factor for tallness is labile in *Lamarckiana* since that species can give rise to *nanella* through a mutation, while it is only active in *rubrinervis* since the latter can not give rise to *nanella*. In *nanella* it is considered inactive rather than absent. Correlated with this is the fact that, as we have seen above, *Lamarckiana* × *nanella* splits off dwarfs in F_1, while *rubrinervis* × *nanella* splits them off in Mendelian fashion, *i. e.*, in F_2.

Instead of the impossible and self-contradictory assumptions regarding degeneration of certain classes of germ cells or zygotes in the various crosses, DeVries made the one assumption that in the zygotes of, *e. g.*, *Lamarckiana* × *nanella* either one or the other form or condition obtains ascendency, to the complete exclusion of the other form in later generations. This view is at least self-consistent, which cannot be said of the Mendelian "explanation." If any Mendelian can suggest an alternative explanation which avoids the pitfalls pointed out above, we shall be glad to see it. We have shown at any rate that in the particular group of crosses considered above, the attempt to hide behind sterility as a means of offering a Mendelian explanation only leads to difficulties. So far as we can see, the Mendelian explanation fails hopelessly in all these cases and in others as well.

It will be time enough to consider East's other objections to the point of view of my book when the points discussed above have been cleared up.

AN OVERLOOKED ENVIRONMENTAL FACTOR FOR SPECIES OF PRUNUS.

Roland M. Harper.

In the March number of Rhodora, pages 66–70, Mr. Bayard Long reports finding *Prunus cuneata* on the southeast side of a creek or small river in the pine-barrens of Ocean County, New Jersey, especially on a gravelly railroad embankment in the creek swamp; and he discusses at some length the question of whether it can be native there, in view of the fact that no other stations for it are known within many miles.

A minor point in his discussion may as well be disposed of first. Assuming that the plants at the top of the railroad cut nearest the creek are indigenous, it probably matters little whether the soil of the neighboring embankment where they grow more luxuriantly came from that cut or a thousand miles away, for the seeds are just as likely to have been transported to that spot by birds or other animals as in the cars that hauled the earth many years ago.

Mr. Long did not seem to grasp the significance of the location of his plants with reference to the creek swamp. The typical pine-barrens of New Jersey, as is well known, are burned over every few years; but the edge of a swamp, being protected on one side, is less subject to fire, especially *on the side away from the main body of pine-barrens*, as in the present instance; and a gravelly embankment in a swamp ought to be almost wholly exempt from fire.

Plants not provided with thick bark or subterranean stems cannot endure frequent fires, and no species of *Prunus* (including the sections or subgenera *Padus*, *Cerasus*, etc.), in eastern North America at least, seems to be very well protected in either of these ways. Of those the writer is acquainted with, *P. serotina*, *P. umbellata*, *P. Americana*, *P. Caroliniana* and *P. sphaerocarpa* grow mostly in rich woods, where there is too little undergrowth to make much of a blaze. *P. angustifolia* is a weed of old fields and fence-rows, and *P. serotina* is found in such situations about as often as in natural habitats. *P. Pennsylvanica* is one of the characteristic "fireweeds," that spring up in the intervals between fire in the northern coniferous forests, and *P. pumila* and *P. maritima* prefer sandy and rocky shores, where the vegetation is too sparse to carry fire and the water affords protection on one side. *P. Besseyi* grows in the barrenest places on the sand-hills of Nebraska and neighboring states, where the vegetation is sparsest,[1] and *P. geniculata* on high sandy hills in the lake region of central Florida, where fire is less frequent than in the more grassy typical pine-barrens.[2]

Possibly some reader may recall seeing some species of *Prunus* touched by fire and not killed; but a few exceptions will not materially affect the truth of the assertion now made that fire, whether of natural or artificial origin, is much less frequent in the habitats affected by

[1] See Pool, Minn. Bot. Stud. **4**: 230, 236, 239. 1914; and review in Bull. Am. Geog. Soc. **47**: 873–874. 1915. The writer made the acquaintance of this shrub in northeastern Colorado after that review was written.

[2] See Torreya **11**: 64–67. 1911.

species of *Prunus* than in the case of some other woody plants, the pines and oaks for instance. The interested reader may find it worth while to study the statements about the habitats of *Prunus* in Sargent's Silva, Wight's Native American species of Prunus (U. S. Dept. Agr. Bull. 179. 1915), and some of the more elaborate local floras, such as the recent flora of Connecticut by Graves and others, Stone's flora of southern New Jersey (referred to by Mr. Long, and reviewed by the writer in Torreya **12**: 216–225. 1912), Kearney's Botanical Survey of the Dismal Swamp region, and Mohr's Plant Life of Alabama.

Many other genera of plants of course are just as sensitive to fire as *Prunus* is, and any one who wishes to look further into the effects of this neglected environmental factor can find references and cross-references in the following places:— Bull. Torrey Bot. Club **38**: 522. 1911, **41**: 217. 1914; Torreya **12**: 147, 219. 1912; **15**: 30. 1915; Geol. Surv. Ala. Monog. **8**: 211. 1913; Pop. Sci. Monthly **85**: 338. 1914; Ann. Rep. Fla. Geol. Surv. **6**: 184–185, 282–283, 286, 442. 1914; **7**: 143, 147–148, 165, 335. 1915.

College Point, New York.

Reprint of a rare Book on American Plants. — Mr. S. N. Rhoads of Philadelphia has made accessible to botanists, through reprinting, "the earliest published book, written by an American Botanist and devoted exclusively to American Botany, Horticulture and Floriculture." [1] This work is divided into two parts, 1. Catalogue d'Arbes, Arbustes, et plantes herbacées d'Amérique. 2. Liste des Arbres, Arbrisseaux & Plantes qu'on ne peut se procurer que par des voyages dispendieux dans le continent de l'Amérique, & que M. Yong n'a point encore élévés en assez grand nombre pour les envoyer en Europe. Many of the names are binomials and some of them are characterized as "nova species," but the descriptions are so meager and vague that they have little defining power, as for instance "*Angelica pastinaca, nova species.* Elle a 5 pieds de haut & croit dans un sol marécageux," and, therefore, they should not be taken up to displace names with good descriptions made later. This old book has been neglected or overlooked for many years. It does not appear in the botanical bibliographies and the new names are not cited in the Index Kewensis. William Young Jr., the author, was a nurseryman and a gardener, a near neighbor of John Bartram

[1] M. Yong [William Young, Jr.] Catalogue d'Arbres, Arbustes et plantes herbacées d'Amérique — Paris, 1783.

of Philadelphia. He sent and carried many living plants to England for cultivation and was appointed "Queen's Botanist." Mr. Rhoads's task in searching out so thoroughly the history of W. Young has not been an easy one but he has brought together a good account of this man and his work, and while the catalogue is not of great scientific value it has much historical interest.— MARY A. DAY.

A POPULAR HANDBOOK TO THE MOSSES.— Mrs. Elizabeth M. Dunham in "How to Know the Mosses," [1] has undertaken to provide a handbook which will not require the use of a lens of any kind. When one considers that a convenient hand-lens costs only $1.50, and that there is already available such a satisfactory book as Dr. Grout's "Mosses with a Hand-lens," it seems to the reviewer doubtful if the task that Mrs. Dunham has attempted is worth while. Her book should be judged, however, by its purpose, which is to enable "people who are content to recognize violets, asters, and goldenrods, without knowing the specific names .... to know the generic names of mosses." The descriptions show that Mrs. Dunham has a good knowledge of the plants with which she is dealing. The illustrations are very simple, but in general they suggest the habit of the moss to one who is already familiar with it; whether they would be sufficiently suggestive to a beginner is open to question. Photographs would have been much better but would, of course, have added greatly to the cost of the book. A casual testing of the keys seems to indicate that they work out as well as could be expected. No handbook will eliminate the need of judgment and patience, and equipped with these the possessor of "How to Know the Mosses" will have an opportunity to be introduced to a fascinating group of plants, and, we may hope, will be led on to purchase lens and microscope and the more "scientific" books by Dr. Grout.

Upon opening this book and seeing its thirty pages of non-technical keys, the reviewer was reminded of his first, unaided attempt to learn the mosses nearly twenty years ago. Lesquereux and James's Manual was then the only available book, and the would-be student found no keys except the technical analysis of genera at the beginning of the book. After grappling with the heading "capsule sessile on a pedicellate vaginule," he was then confronted by "calyptra mitriform." The moss in hand had no calyptra; no one stood by to say that it was of no consequence; and the attempt to know mosses proceeded no further at that time! Whatever difficulties are encountered in the use of Mrs. Dunham's book, they will certainly not be due to technicalities.— L. W. R.

[1] Houghton, Mifflin Company, Boston, Mass. 1916. $1.25 net.

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